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ABSTRACT

Self-paced, individualized student and teacher workbooks were designed to improve the self-concept and motivation levels of vocational students. The program was based on the correlation between self-concept and school achievement. The program was field tested with 41 Job Corps students from the Gary Job Corps Center in San Marcos, Texas, and their instructors. Three other Job Corps classes in identical occupational fields acted as the untreated control groups. The researchers used pretests and posttests over a six-week period with the Tennessee Self-Concept Scale and the Nowicki Strickland Adult Locus of Control Test to collect data for statistical analysis. The results revealed that motivation-trained students showed significant improvement in self-concept during the six-week period. The results from a nested experimental field design yielded significance only at the 75 percent confidence level, but an un-nested analysis of variance showed significance at the 90 percent level; analysis of covariance showed significance at the 95 percent level. The subjective data gathered from test participants also showed very positive support of the program. It was recommended that the use of the materials be continued, revised, and expanded. (KC)

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Field Test Results of a Workbook Approach to Improving the Self-Concepts and Motivation Levels of Vocational Students

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Abstract

This article presents field test findings of self-paced, individualized student and teacher workbooks which were designed to improve the self-concept and motivation levels of vocational students. The correlation between self-concept and school achievement formed the conceptual base for this program. The program was field tested with forty-one Job Corps students in three classes and their instructors. Three other Job Corps classes in identical occupational fields acted as the untreated control groups. The researchers used pre-tests and post-tests over a six week period with the Tennessee Self-Concept Scale and the Nowicki Strickland Adult Locus of Control Test to collect data for statistical analysis. The results revealed that motivation-trained students showed significant improvement in self-concept during the six-week period. The results from a nested experimental field design yielded significance only at the 75% confidence level, but an un-nested analysis of variance showed significance at the 90% level; analysis of covariance at the 95% level. The subjective data gathered from test participants also showed very positive support of the program.

The research team would like to thank Mr. Billy Don Everett of Central Texas Manpower Consortium, Miss Mary Livers, and the managers of Gary Job Corps Center, who offered invaluable support for this project.

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Field Test Results of a Workbook Approach to Improving the Self-Concepts and Motivation Levels of Vocational Students

Introduction

What happens to the vocational students who have low self-confidence and low motivation levels? An instructor with superior motivational ability can often challenge them to achieve. Rarely, however, does a school provide any structured training to help students improve self-concept and motivation. This gap in educational training is surprising since industry demands workers who have good attitudes and self-starting abilities.

Educators at the newly opened Central Texas Vocational Skills Training Center in Killeen, Texas are doing something about the motivation training gap. The Texas Education Agency awarded a grant to the Skills Center for developing and field-testing a motivation training program to include a self-paced, individualized workbook for improving student self-concept and a pre-service training workbook for teachers. This report describes the workbooks which were developed and the results of the initial field test at the Gary Job Corps Center in San Marcos, Texas.

The student training workbook, entitled "Be a self-confident, self-reliant, and self-directed student," provides an opportunity for students to work on their own self-concepts. It takes a self-paced, hands-on approach to self-concept growth. In the exercises, students can explore their inward selves and begin changing things they dislike about themselves. Table A shows the six learning tasks of the student module in sequence with approximate time for completion.

The pre-service teacher training workbook, like the student workbook, is self-paced and individualized. It explains how to administer the student workbook and how to use teaching techniques which increase student self-concept and motivation for learning. Instructors can complete the workbook in six to nine hours. Table B indicates the learning tasks of the teacher workbook in sequence with approximate time for completion.

Table A — Student Motivation Training
Student Workbook (6th Grade Reading Level)

Training Day	Approximate Time to Complete	Workbook Tasks
1	1 hour	1. Find out how you feel about your life as it is today.
2	1 hour	2. Find out what things are keeping you from having the kind of life you want and what you can do about them.
3	1 hour	3. Learn how to change negative thoughts to positive ones.
4	1 hour	4. Make a social contract with your major skill instructor.
5	45 minutes	5. Learn how to set learning goals.
	15 minutes	6. Review what you have learned about becoming a self-confident, self-reliant, and self-directed student.
	5 hours	

Table B — Teacher Training Workbook

Approximate Time To Complete	Workbook Tasks
1 — 2 hours	1. Read the student workbook and learn how to administer it.
1 hour	2. Examine the way self-concept influences motivation to succeed.
1 — 2 hours	3. Practice empathetic communication skills that enhance student self-concept.
1 hour	4. Use the self-fulfilling prophecy of success.
1 — 2 hours	5. Describe a facilitative teaching method.
1 hour	6. Explain how being an accountable instructor helps increase student self-concept and motivation.
6 — 9 hours	

Theoretical Foundation of Training

The correlation between student self-concept and school achievement forms the theoretical foundation of this training. Educational research over the past two decades indicates that students who have high positive self-concepts show higher levels of academic achievement than those students with low self-esteem (Millard, 1979). Some researchers argue about whether self-concept is a cause or effect of academic achievement, but, according to Fitzgibbon (1980), it seems evident that in order to change achievement, the self-concept must change. Mazzarella (1979) says, "Research indicates that if students are to achieve, they must first see themselves as achievers. Improving self-concept means helping students have faith in their own abilities." A model by Wlodkowski, reviewed by DeLeonibus (1979), includes self-esteem as one of the six key contributing factors to successful goal achievement in school. The Wlodkowski model accurately describes the theoretical foundation of the training workbooks for students and teachers.

Theories about self-concept enhancement in the school environment which focus on the teacher-student relationship strongly influenced the teacher pre-service training workbook. According to Heizenroth (1979), the teacher must first become a "significant other," a respected and admired person in the student's life, in order to improve the student's self-concept. Del Polito (1980) says that since self-concept develops primarily through interactions with others, teachers can enhance student self-concept by using effective communication skills and a high level of empathy.

Field Design

The Skills Center research team field tested the workbooks at the Gary Job Corps Center in San Marcos, Texas. At Gary, 41 students from accounting, welding, and brick masonry classes completed the workbooks during their regular classroom time. The instructors of these classes completed the pre-service teacher training workbooks and agreed to use the recommended techniques for improving student self-concept. Three other classes at the Job Corps Center, designated as "control groups," did not receive any student or teacher training with the workbooks.

This type of design is a "quasi-experiment" using control groups and a nested design. Cook and Campbell (1976) explain a "quasi-experiment" as

one in which intact classes participate. They designate a "true experiment" as one in which the researchers randomly assign students to the classes. (In educational field settings, it is rare that the researchers have the option of assigning students to classes.) The design is known as "nested" since three classes are "nested" under each experimental condition. The figure below graphically displays the experimental nested design.

Nested Field Design

Control Groups			Motivation-Trained Groups		
Typing Class	Brick Masonry Class	Welding Class	Clerk Accounting Class	Brick Masonry Class	Welding Class

The researchers chose a nested design to help control for unique effects that teachers might contribute to the outcome of the study. The nested design requires that a minimum of two teachers be assigned to each variation of treatment. This allows for a more controlled test than if only one control group and one treatment group were compared. In the two-group comparison, if a significant gain in self-concept occurred in the motivation-trained group and not in the control group, it would be impossible to tell whether this was the result of training, something unique about the class, or something unique about the teacher. Dayton (1976) explains that the nested design makes it more reasonable to attribute significant results to treatment rather than to special effects outside the researchers' control.

The researchers followed the recommendations of Dayton (1970) for the statistical analysis of the data obtained in the field design. Dayton states that each of the classroom groups will have a mean on the test measure of interest, which he calls $\overline{G}$. A completely randomized design (CRD) utilizing these group means as the basis data is:

Control	Motivation-Trained
$\overline{G}_1$	$\overline{G}_4$
$\overline{G}_2$	$\overline{G}_5$
$\overline{G}_3$	$\overline{G}_6$

For this type of nested design, Dayton (1976: 219) recommends that from class means, a sum of squares for treatment be computed from column sums and a sum of squares for error be computed from within-column information. He states that the appropriate F ratio to test the null hypothesis is MS_{treat}/MS_{error} with p - 1 and p (q - 1) degrees of freedom where p = the number of treatments and q = the number of classes nested under each treatment.

The statistical procedure which Dayton recommends is a simple one-way analysis of variance, a technique for testing the differences between groups. Dayton says that the recommended way to analyze the nested design results is to consider the class averages of the control classes as one group and the class averages of the experimentally treated classes as a second group. so that M_1 is the mean of the control averages and M_2 is the mean of the experimental averages. The null hypothesis to test will therefore be that no significant difference exists in the means of the two groups—that is, $H_o: M_1 = M_2$.

To test the hypothesis, the standard formulas for analysis of variance (see Dayton, 1976: 219-221) can be used on the two groups of scores to compute the F statistic. The F statistic is a measure which indicates the amount of variation between the groups. A larger F statistic indicates a larger variation between groups. By comparing the F statistic to the F tables, the researchers can reject or fail to reject the null hypothesis. By convention, the researchers have chosen to reject the null hypothesis at the 95% confidence level. This means that, given that the null hypothesis is true, the F value computed for the obtained data would have occurred only five times out of one hundred. The researchers then conclude that the null hypothesis is probably false and can safely be rejected.

Collection of Data

The researchers tested students with the Tennessee Self-Concept Scale and the Nowicki Strickland Adult Locus of Control before the training and again six weeks following training. The pre-tests were given to determine whether the groups started with equivalent levels of self-esteem and internal motivation. Since the classes were intact groups, it could not be assumed that they would be equivalent. The pre-testing of students took place at the Gary Job Corps Center library the week before the experimental classes began the motivation training workbooks. Before the test was administered, the students received instructions that the

researchers were developing new curricular materials for vocational students and needed the information in the surveys to write appropriate materials. Six weeks later, all of the students who remained in their original classes took the post-tests. Before the post-tests, the students were informed that they would be asked to take the same surveys again to indicate whether they had or had not changed their opinions during the last six weeks.

The Tennessee Self-Concept Scale is a widely recognized measure of self-esteem. On this test, students may indicate on a numerical scale ranging from 1 to 5 whether a statement is true or false about themselves. Test instructions tell the student to answer the questions "as if you are describing yourself to yourself" (Fitts, 1965). Some sample statements from the test are the following: "I am a nobody"; "I have a lot of self-control"; "I am as smart as I want to be"; and "I despise myself." The total score, which indicates level of overall self-esteem, provided the raw data for the statistical analysis.

One key advantage of using this test is that it has a high test/re-test reliability coefficient (.92) over a tested two-week period (Fitts, 1965). This indicates that scores are relatively stable over time. The primary disadvantage of using this test with the Job Corps students is that in the field test, the confusing form of the answer sheet as well as some of the words used in the questions caused difficulties for those with very low reading levels. The researchers recommend that similar studies use a revised version of this test, possibly with the questions being tape-recorded and played for students.

The Nowicki Strickland Adult Locus of Control Test measures the perceived level of personal control an individual has over life events. This test was used in order to determine whether students might become more internally self-directed and motivated as a result of the training. On this test, students answer simply "yes" or "no" to a series of questions. Some sample questions are the following: "Do you believe that most problems will solve themselves if you just don't fool with them?"; "Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?"; and "Do you think that people can get their own way if they just keep trying?" This test reports a high test/re-test correlation of .83 over a six-week period (Nowicki and Duke, undated). This test did not cause any difficulty for the students with low reading levels.

Field Test Results

The results of the Tennessee Self-Concept Scale pre-tests and post-tests, which served as raw input data for the statistical analysis, is shown in Table C. Only data from valid pre-test/post-test pairs were used in this investigation. Following the "nested" experimental design, the researchers performed a one-way analysis of variance (ANOVA) on the pre-test scores to determine whether a significant difference existed in the classes prior to the experimental training. The computed value of the F statistic for the pre-test scores was F = .2715. This low value indicates no significant differences in the classes on the Tennessee Self-Concept Scale pre-test. Again following the "nested" design, the researchers analyzed the post-test results. The analysis of variance for the post-tests indicated a computed F statistic of F = 2.98. This value is significant at the 75% confidence level, but not at the 95% level. (See Table D for the results of the post-test analysis.) The researchers were therefore unable to reject the null hypothesis at the chosen 95% confidence level.

A graphical analysis of the data, however, yielded an interesting result. Tables E and F graph the pre-test/post-test results of the students grouped without regard to classes, but with regard to the treatment variation. This graph shows clearly that the motivation-trained students and the control group students were moving in the expected direction with the trained students scoring higher on self-esteem.

Since the graphical analysis showed a clear trend of improvement in the motivation trained students, the researchers decided to perform a less conservative "what if" statistical procedure. For this analysis, they made the assumption that the students in the pilot test were randomly assigned to two classes, a control group and a motivation trained group. The advantage of doing this is, of course, to lower the value of the F statistic required for significance by increasing the size of the samples.

The results of this analysis were highly positive. A one-way analysis of variance using this two-group design and individual student scores showed significance at the 90% confidence level. An analysis of covariance with the pre-test as the covariate produced significance at the 95% confidence level. The analysis of covariance (ANCOVA) is an analysis of variance technique which adjusts the post-test scores based on pre-test levels. This compensates for differences in pre-test levels of the groups. Table G displays the results of this analysis.

Table C — Gary Job Corps
Tennessee Self-Concept Scale

	Control Group Brick Masonry	Motivation Trained Brick Masonry
Pre	320.0	318.0
Post	315.0	326.8
N	4	5

	Control Group Welding	Motivation Trained Welding
Pre	334.9	344.9
Post	328.0	360.0
N	8	7

	Control Group Typing	Motivation Trained Clerk Accounting
Pre	324.7	330.7
Post	321.3	333.7
N	6	7

	Total Control	Total Motivation
Pre	328.2	332.6
Post	322.9	341.8
N	18	19

Table D
ANOVA of Tennessee Self-Concept Post-Test Scores
Nested Experimental Design

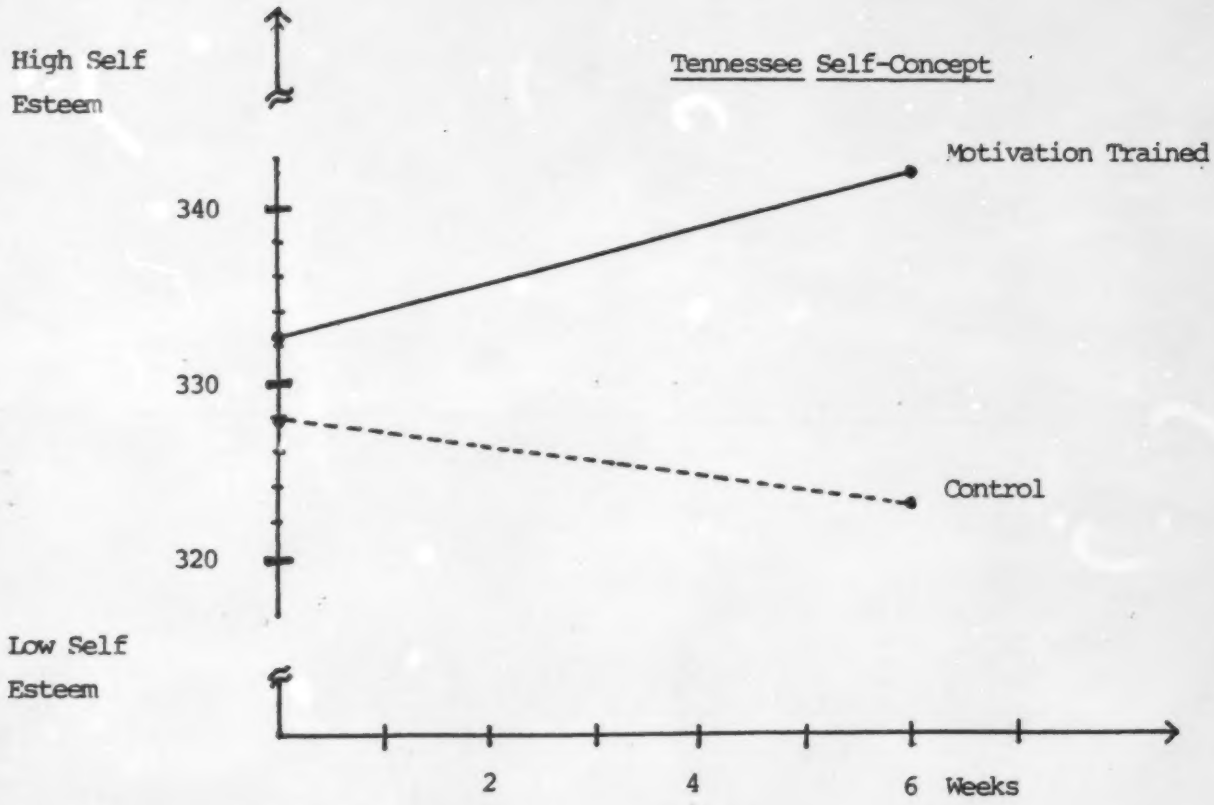
Source	df	SS	MS	F*
Between Groups	1	537.71	537.71	2.98
Within Groups	4	722.41	180.60	
Total	5	1260.12		

*$F_{1,4,.25} = 1.81$ $F_{1,4,.05} = 7.71$

Table E

Student Motivation Training

Gary Job Corps, Texas

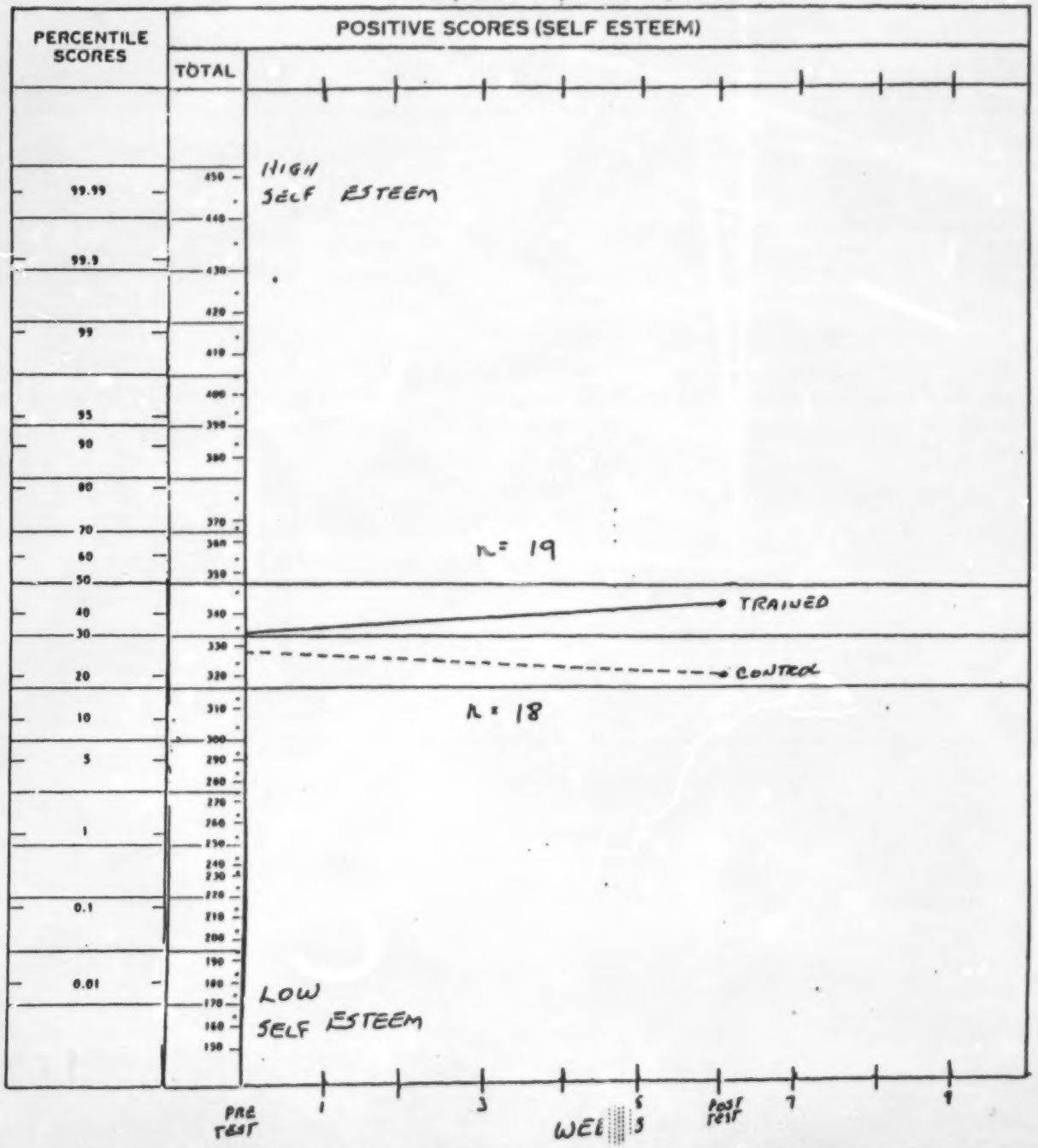


Trained		Control	
Pre	332.58	Pre	328.17
Post	341.79	Post	322.89
N	19	N	18

Table F

Student Motivation Training

Gary Job Corps Center, Texas



TENNESSEE SELF CONCEPT SCALE

	TRAINED	CONTROL
PRE	332.58	328.17
POST	341.79	322.89
GRAPH	———	- - - -

n = NUMBER IN THE SAMPLE

16

17

9/10/81

Table G
ANOVA — Tennessee Self-Concept Post-Tests
Assumption of Two Group Design

Source	df	SS	MS	F*
Between Groups	1	3301.9814	3301.9814	3.41
Within Groups	35	33938.8789	969.6823	
Total	36	37240.8594		

ANCOVA — Tennessee Self-Concept Post-Tests
Assumption of Two Group Design

Source	df	SS	MS	F*
Between Groups	1	2053.2891	2053.2891	7.4070
Within Groups	34	9425.1484	277.2102	
Total	35			

*$F_{1,30,.10} = 2.88$
$F_{1,30,.05} = 4.17$
$F_{1,30,.01} = 7.56$

A statistical analysis identical to that performed on the Tennessee Self-Concept scores was completed for the Nowicki Strickland test data. Results of this analysis reveal no significant difference in either the pre-test or the post-test results of the trained and the untrained classes. As measured by this test, the internal motivation levels remained stable during the six weeks of the pilot test. Tables H and I show the pre-test and post-test classes' scores for this survey. The motivation-trained students show a slight improvement as compared to the control group. A longer period of treatment might yield more definitive results for locus of control change in students.

Self-Study Results

In addition to the statistical analysis, the researchers gathered valuable subjective data from the students, teachers, and administrators who participated in the field test. This information helps present a better idea of how the motivation training affected the lives of the individuals in the pilot program. The data obtained in this self-study shows very positive support. For example, a survey of trained students given immediately following the workbook completion shows that 97% of the students agreed that the module motivated them to become more self-confident, self-reliant, and self-directed. As one brick masonry student wrote, "It gives a person a way to get help." A welding student commented, "It is a very good feeling." An accounting student said, "I learned to understand myself and others better. We should 'module' like this more often!" The results of several questions on this survey can be viewed in Table J.

Teachers who completed the workbooks made favorable comments about the materials in personal interviews with the researchers. One Gary Job Corps instructor said:

> I appreciate the opportunity to have been a part of the field test. The pre-service training was very helpful to me. I have even started to use some of the techniques at home with my children. I have a daughter who is learning-impaired and sometimes I forget how important it is to just stop and really listen to what she has to say. You know, a lot of what I deal with as a Job Corps instructor are student emotions and frustrations. . . especially with new students. At the beginning I may have to work on 90% affective skills and only 10% cognitive skills. I can really only get through to students after I help them with their emotional problems. This training really helped me with that.

Table H — Gary Job Corps
Nowicki Strickland Adult Locus of Control

	Control Group Brick Masonry	Motivation Trained Brick Masonry
Pre	19.5	16.8
Post	22.3	14.8
N	4	5

	Control Group Welding	Motivation Trained Welding
Pre	15.7	15.9
Post	15.7	14.6

	Control Group Typing	Motivation Trained Clerk Accounting
Pre	15.0	16.8
Post	16.5	16.7
N	6	7

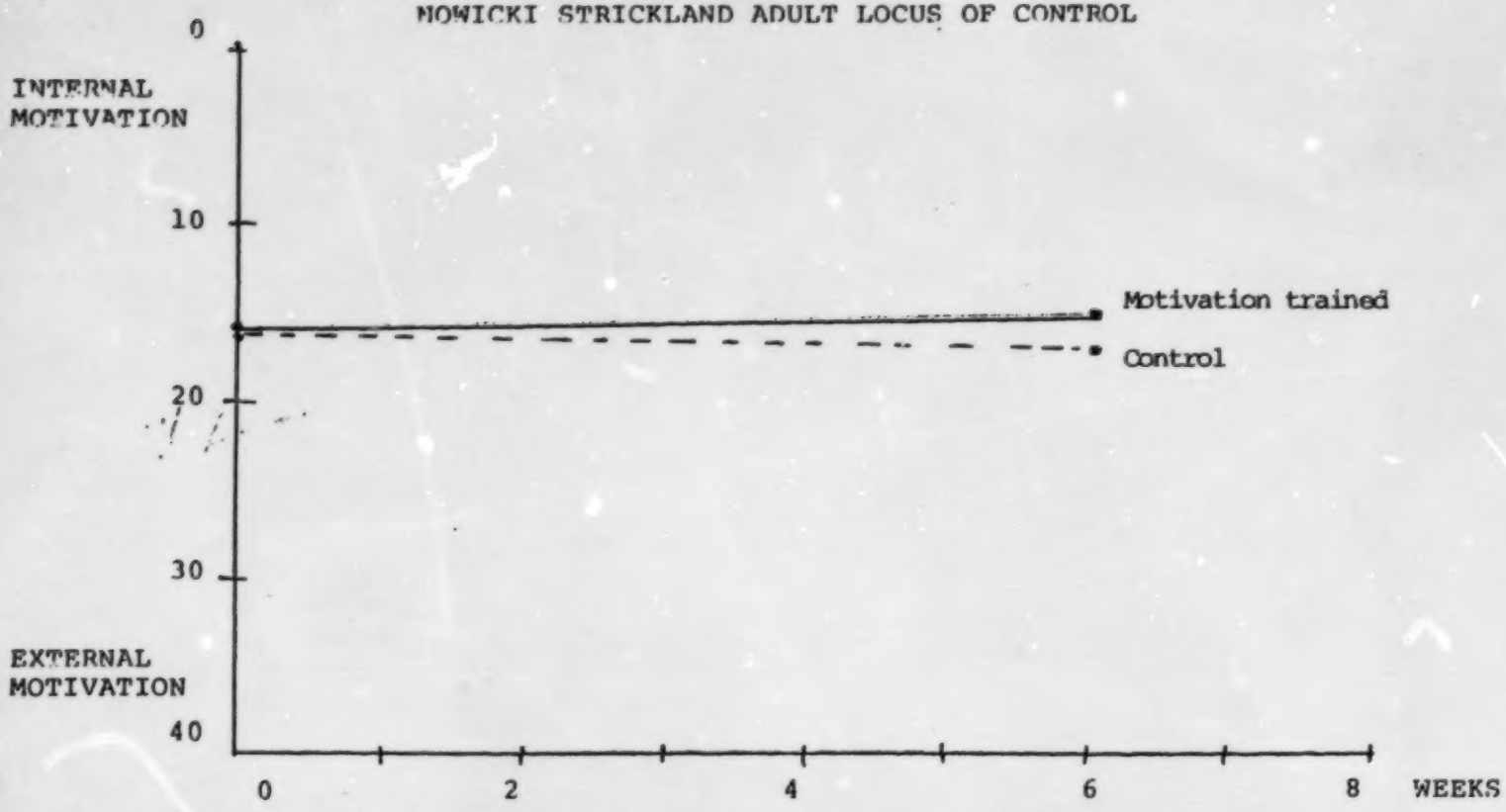
	Total Control	Total Motivation
Pre	16.4	16.5
Post	16.9	15.4
N	17	19

Published Norms (Nowicki and Duke, undated)

Group	Mean
Grade 9 (n = 87)	13.06
Grade 10 (n = 115)	13.02
Grade 11 (n = 90)	12.40
Grade 12 (n = 87)	11.81
College (n = 87)	9.06
Community (n = 33)	10.96

Table I

GARY JOB CORPS
NOWICKI STRICKLAND ADULT LOCUS OF CONTROL



	CONTROL GROUP	MOTIVATION TRAINED GROUP
PRE	16.4	16.5
POST	16.9	15.4
N	17	19

Table J

Student Evaluation of Training Survey*

"How would you rate this module on helping students become more self-confident, self-reliant, and self-directed at this school?"

	Gary Job Corps Center
Perfect in every respect	17%
Very good	42
Good	24
Could use minor changes	17
Not very good	0
Better than nothing	0
Extremely poor	0
	100%

"Describe your feelings as you were working the exercises."

Strongly liked	41%
Liked	31
Neutral	21
Didn't like	7
Strongly disliked	0
	100%

"Do you agree or disagree with the statement "This module motivated me to become more self-confident, self-reliant, and self-directed"?

Decidedly agree	14%
Mostly agree	69
Slightly agree	14
Slightly disagree	0
Mostly disagree	3
Decidedly disagree	0
	100%

*n = 29

The Director of Training and Education at Gary Job Corps, Mary Livers, believes that the training supports the philosophy of Job Corps since one of the primary objectives of Job Corps is to build self-confidence and self-esteem in students. In evaluating the Skills Center's program, Mary Livers comments that the Gary Job Corps Center personnel are very enthusiastic about the motivation training because, in her words, "It matches what we've been doing all along, but just never had the opportunity to put in written form."

Discussion

The comments from students, teachers, and administrators in the self-study, along with the encouraging results of the statistical study, indicate that the motivation workbooks do offer a good starting point for filling the motivation training gap in vocational education. The administrators at the Skills Center plan to expand the use of the materials and continue to revise and refine the program.

Future Research

It is anticipated that future motivation research efforts will involve the following major activities:

1. Increasing student motivation toward basic skills mastery by developing specialized training modules specifically for this purpose.
2. Testing the hypothesis that self-concept enhancement is directly connected to increased motivation toward learning.
3. Utilizing the motivation materials as an aid to student retention.

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